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INTERNATIONAL PRELIMINARY EXAMINATION REPORT

(PCT Article 36 and Rule 70)

28 DEC 2004

App	olicant'	s or ag	ent's file reference	1		Sac Notifica	tion of Transmittal of International
URC041BWO				FOR FURTHER	ACTION	Preliminary	Examination Report (Form PCT/IPEA/416)
International application No.				International filing da	ate <i>(day/mon</i>	th/year)	Priority date (day/month/year)
PCT/EP 03/05839 04.06.200						28.06.2002	
	matior 7C27		ent Classification (IPC) or	both national classificati	on and IPC		
	licant EA C	ASAI	_E S.A.				,
1.	This Auti	s inter hority	national preliminary exa and is transmitted to the	amination report has be applicant according	een prepar to Article 3	ed by this In 6.	ternational Preliminary Examining
2.	2. This REPORT consists of a total of 5 sheets, including this cover sheet.						
	This report is also accompanied by ANNEXES, i.e. sheets of the description, claims and/or drawings which have been amended and are the basis for this report and/or sheets containing rectifications made before this Authority (see Rule 70.16 and Section 607 of the Administrative Instructions under the PCT).						
	These annexes consist of a total of 2 sheets.						
3.	This	repoi	t contains indications re	elating to the following	ı items:		
	1	\boxtimes	Basis of the opinion				
	11		Priority				
	Ш		Non-establishment of	opinion with regard to	novelty, in	ventive step	and industrial applicability
	IV		Lack of unity of invent				•
	V 🛮 Reasoned statement under Rule 66.2(a)(ii) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement						
	VI		Certain documents cit				
	VII		Certain defects in the	international applicati	on		
	VIII		Certain observations of	on the international ap	plication		
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Date of submission of the demand			Date of c	ompletion of t	hls report		
16.10.2003					18.10.2	2004	
Name prelim	Name and mailing address of the international preliminary examining authority:				Authorize	ed Officer	usines Pelanian,
European Patent Office - P.B. 5818 Patentlaan 2 NL-2280 HV Rijswijk - Pays Bas Tel. +31 70 340 - 2040 Tx: 31 651 epo nl Fax: +31 70 340 - 3016				98	Delang	he, P e No. +31 70	Sept California
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INTERNATIONAL PRELIMINARY EXAMINATION REPORT

International application No.

PCT/EP 03/05839

1.	Basis	of the	report
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1. With regard to the **elements** of the international application (Replacement sheets which have been furnished to the receiving Office in response to an invitation under Article 14 are referred to in this report as "originally filed" and are not annexed to this report since they do not contain amendments (Rules 70.16 and 70.17)):

	De	escription, Pages								
	1-	16	as ori	iginally filed						
	Cl	Claims, Numbers								
	1-13, 15			iginally filed						
	14		receiv	ved on 28.09.2004 with letter of 28.09.2004						
	Dr	awings, Sheets								
	1/7	'-7 <i>/</i> 7	as ori	iginally filed						
With regard to the language, all the elements marked above were available or furnished to this Author language in which the international application was filed, unless otherwise indicated under this item.										
	The	ese elements were a	vailable or furnis	shed to this Authority in the following language: , which is:						
		the language of a ti	ranslation furnisl	shed for the purposes of the international search (under Rule 23.1(b)).						
				nternational application (under Rule 48.3(b)).						
		the language of a tr Rule 55.2 and/or 55	ranslation furnisl 5.3).	hed for the purposes of international preliminary examination (under						
 With regard to any nucleotide and/or amino acid sequence disclosed in the international application, th international preliminary examination was carried out on the basis of the sequence listing: 										
		contained in the inte	ernational applic	cation in written form.						
		filed together with the	ne international a	application in computer readable form.						
		furnished subseque	ently to this Author	ority in written form.						
		furnished subseque	ntly to this Author	ority in computer readable form.						
		The statement that in the international a	the subsequentl application as file	ly furnished written sequence listing does not go beyond the disclosure led has been furnished.						
		The statement that the listing has been furn	the information r nished.	recorded in computer readable form is identical to the written sequence						
١.	The	amendments have r	esulted in the ca	ancellation of:						
		the description,	pages:							
	\boxtimes	the claims,	Nos.:	16						
		the drawings,	sheets:							

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5. 🗆	This report has been established as if (some of) the amendments had not been made, since they have
	been considered to go beyond the disclosure as filed (Rule 70.2(c)).

(Any replacement sheet containing such amendments must be referred to under item 1 and annexed to this report.)

6. Additional observations, if necessary:

V. Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

1. Statement

Novelty (N) Yes: Claims 1-15

No: Claims

Inventive step (IS) Yes: Claims 1-15

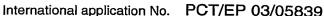
No: Claims

Industrial applicability (IA) Yes: Claims 1-15

No: Claims

2. Citations and explanations

see separate sheet





Re Item V

Reasoned statement with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

1. Document

Reference is made to the following document:

D1: WO 00/43358 D2: US 4 519 446

The document D2 was not cited in the international search report. A copy of the document is appended hereto.

2. Subject matter

Claims 1-15 define a plant for the production of urea from ammonia and carbon dioxide, using a high-pressure plant, comprising a reactor, a condenser, a stripper and a scrubber, all operated at high-pressure. The synthesis reactor and the condensation unit are located in the same reactor-shell. The condenser comprises a plurality of plate-shaped heat-exchangers, arranged with long sides parallel to the axis of the reactor. A higher condensation capacity and as a result a higher urea plant capacity is claimed over the prior art.

3. Novelty

There are no documents in the prior art disclosing a urea plant with a high-pressure section, which comprises a synthesis portion and a condensation unit inside the same reactor shell, wherein the condensation unit consists of a plurality of plate-shaped rectangular heat exchangers, arranged with long sides parallel of the reactor. Therefore, the present application does meet the criteria of Article 33(1) PCT, and the subject-matter of claims 1-15 is new in the sense of Article 33(2) PCT.

4. Inventive step

The document D1 is regarded as being the closest prior art to the subject matter of claim 1 and discloses (see page 4, line 25 - page 5, line 7, page 9, lines 15-18 and the figures) a plant comprising a reactor unit shell, which comprises a reactor and a condensation zone, wherein the condenser is a tubular heat exchanger (pool condenser). The subject-matter of claim 1 differs from this known D1 in that as the condenser a plurality of plate-shaped rectangular heat exchangers, parallel to the axis of the reactor, is used instead of a tubular heat exchanger.



INTERNATIONAL PRELIMINARY **EXAMINATION REPORT - SEPARATE SHEET**

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The problem to be solved by the present invention may be regarded as an urea production plant, providing higher overall urea production capacity than that which can be obtained with the plant according to D1. The use of a plate-shaped condenser with higher cooling capacity makes an important contribution thereto.

The documents of the prior art do not suggest the use of a plate-shaped rectangular heat exchanger in a high pressure reactor/condenser process unit to solve the abovementioned problem. Thus, given the teaching of the prior art, the skilled person would not consider solving the problem by exchanging a tubular shaped condenser with a plate-shaped condenser as in the present application, and he certainly would not expect the improvement associated with the present application. Therefore, the solution proposed in claim 1 of the present application can be considered as involving an inventive step (Article 33(3) PCT).

Using the same argumentation the dependent claims 2-15 are also inventive.



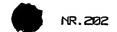
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of said metallic plates, extending perpendicularly to said ducts (31, 32).

- 11. Plant according to claim 10, characterised in that each of said chambers (121a) is internally equipped with a plurality of deflector plates (122), extending parallel to said ducts (31, 32) and defining a substantially winding path for said operating fluid.
- 12. Plant according to claim 1 and according to any one of claims 2 to 11, characterised in that said condensation unit has a substantially annular cylindrical configuration, crossed axially by a passage (14) with a predetermined diameter, in which said plurality of heat exchangers (17, 117, 123) are distributed in many coaxial and concentric rows, in a substantially radial arrangement.
- 13. Plant according to claim 2, characterised in that at least one of said exchangers (123) is internally equipped with a separator plate (124), extending from one side (123c) of said exchanger (123), towards a side (123b) opposite it and from which said plate (124) is in a predetermined distanced relationship, said plate (124) defining in said chamber (125) a substantially U-shaped fluid path having descending and ascending portions (125a, 125b), respectively, in communication with the outside of the exchanger through respective connectors (126, 127).
- 25 14. Heat exchange unitPlant according to claim—13,- characterised in that said separator plate (124) extends in said chamber (125) in a direction forming an angle with said side (123c), for which reason the portions (125a, 125b) of said fluid path inside the exchanger (123) have a gradually increasing cross-section.



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15. Plant according to any one of the previous claims, characterised in that said exchangers (17, 117, 123) have predetermined cross sections of less than the cross sections of a manhole opening arranged in correspondence with a base plate of said reactor.

16.—Condenser, in particular for the so-called highpressure section of a plant for usea production from
ammenia and carbon-dioxide, comprising a condensation unit
(7, 107) in turn comprising a plurality of flattened plate
shaped essentially rectangular boot exchangers (17, 117,
123), as ranged with long sides (17a, 117a, 123a) parallel
to the axis of said condenser.